



# Florida Department of Transportation

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August 6, 2003

**THIS MEMO HAS EXPIRED**

**MEMORANDUM NO. 24-03**

**TO: DISTRICT CONSTRUCTION ENGINEERS  
DISTRICT MATERIALS ENGINEERS**

**FROM:** <sup>for</sup> Ananth Prasad, P.E., State Construction Engineer  
Tom O. Malerk, P.E., State Materials Engineer

**COPIES:** Jim St. John (FHWA), Bob Burleson (FTBA), Jim Warren (ACAF),  
Freddie Simmons, David Sadler

**SUBJECT: GUIDANCE TO ASPHALT VERIFICATION TECHNICIANS**

A recent review of several asphalt construction projects conducted jointly by the Federal Highway Administration (FHWA), State Materials Office and State Construction Office revealed several serious concerns in the implementation of Contractor Quality Control (CQC) Specifications. As a result of these findings, changes to the oversight role the Department provides are necessary to assure the uniformity and integrity of CQC program.

Effective immediately, the Districts are to implement the following measures:

- The District Materials Office will perform Independent Verification (IV) testing, until further notice, at a frequency of once per 4,000 tons of produced mix to monitor the effectiveness of Contractor's QC program.
- The Plant Verification Technician (VT) must be at the asphalt plant at all times during production and testing of asphalt for Department projects in order to monitor the Contractor's Quality Control (QC) operations.
- The Plant VT is responsible for generating the random numbers by using the Department's computerized spreadsheet (available at <http://materials.dot.state.fl.us/smo/Bituminous/fieldoperations/worksheets/multiplesamplesummary.xls>) at the beginning of each LOT. The random number must be kept confidential and at no point should be shared with the Contractor ahead of when the sample is to be taken. The Plant VT will direct the Contractor when and where to sample and will watch the sampling and

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splitting operations to ensure that the quality control, verification and resolution samples are correctly sampled, boxed, and identified (Project Number, LOT, subplot, date, type). The Plant VT shall also make certain that the boxes are sealed (taped closed), sign his/her name across the seal and ensure that each box is stored in secure location. All verification testing should be conducted after the entire LOT is completed.

- The Plant VT must ensure that QC personnel are recording the raw test data (specifically raw weights) on the appropriate Department form and ensure that such information is directly transferred by the Contractor on to the Department's approved report and spreadsheet and entered into the Department's database. The QC testing shall be completed no later than 10 am the following day. The QC data shall be entered into the Department's database within 1 working day after the QC testing for the LOT has been completed and the reports accepted by the Department's personnel. Ensure that the Contractor is not utilizing any unapproved forms (scratch pieces of paper, etc.) as an intermediate step prior to recording the raw data onto the Department's approved forms. The Plant VT must ensure that the Contractor is keeping any and all records, in a hard copy format, in accordance with the Contract. The copies of such reports (including the handwritten raw data) shall be delivered by the Plant VT to the Project Administrator for retention and the VT shall be faxed to the District Bituminous Engineer (DBE), if requested, at the end of each day's production. Any corrections made to the data shall be made by striking through the incorrect data with a single line and writing the correct data above the struck through data with the Technician's name initial beside it and brief explanation of why such correction is being made. Erasing any data is prohibited.
- The Plant VT shall document and update the QC, Verification, and Independent verification (IV) testing results on the Mix Design Summary Spreadsheet (available at <http://materials.dot.state.fl.us/smo/Bituminous/fieldoperations/worksheets/singlesamplesummary.xls>) and monitor the trends of the critical material characteristics variation in order to determine if such changes affect the quality of the product. The Plant/Roadway VT should maintain good communication with Project Administrator, IV Technician, and the District Bituminous Engineer.
- The Roadway VT shall mark the location(s) of where the QC cores are to be cut after the Contractor finishes the compaction operation at such location and ensure that the QC cores are cut at this exact location. The Roadway VT shall ensure that any process control cores taken by the Contractor can be easily distinguishable from the Quality Control cores. Such distinction can be achieved by spray-painting the process control cores and the QC cores with a

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different color or by having the Contractor use a different size core bit to cut the process control cores in the event the spray-painting of the cores is determined ineffective. Once the Contractor tests the process control cores, they shall be destroyed. The Roadway VT must periodically ensure that the cores, designated as the QC cores, were in fact cut at the location as directed by the Roadway VT.

- The Plant and Roadway VT shall randomly check/verify Contractor's QC process control operations by using the Statewide Inspection Guidelines No. 7A and 7B (Fiscal Year 2003/2004), respectively, and Construction Project Administration Manual (CPAM) Section 5.10. A copy of the Guidelines and CPAM Section 5.10 is attached to this memo. Review the QC documents to ensure that all test reports and data forms are kept in order and maintained in file folders systematically.
- Any test result produced in conflict with this memorandum will be deemed invalid for acceptance decisions. The materials represented by that test result would be deemed defective and evaluated in accordance with Section 6-7, 334-7 and 334-9. The procedural requirements are spelled out in the CPAM Section 5.8, Control of Materials.
- Cores cut for the purposes of evaluating material by using an Engineering Analysis Report shall be at the locations directed by the Roadway VT.
- Non-adherence to this memorandum shall constitute failure to adhere to the Contractor's quality control plan and all operations shall cease until an acceptable process is developed by the Contractor and accepted by the Engineer.

The above requirements will be continued until such time the Department determines the necessary checks and balances are in place.

It is very imperative that the Department, the Consultants, and the Contractors all work together on these issues while recognizing that mistakes do happen. Contractor Quality Control concepts was a major change on how we conduct our business and we attribute these issues as part of the growing pains. We will continue to refine these processes to achieve a balance between quality and production that our Customers expect us to deliver.

If you have any questions, please contact David Wang at suncom 994-4152.

PM/sw

**FY 2003/2004 QC Category No. 7A**  
**STATEWIDE INSPECTION GUIDELIST**  
**Asphalt Plant / Lab**

1. The asphalt Quality Control Plan has been approved and the Design Mixes have been verified and approved. All documents are adequately filed. [Spec. 105-4 and 334-3]  
The approved asphalt Quality Control Plan and asphalt mix design has been verified.
2. Technicians performing Quality Control, verification and resolution tests are CTQP qualified. [Spec. 330-2]
3. Testing Laboratory must be qualified under the Department's Laboratory Qualification Program. [Spec. 330-2]
4. The area of laboratory is a minimum of 180 square feet with a layout of which will facilitate multiple tests being run simultaneously by two technicians. [Spec. 330-2]
5. The lighting, temperature control, ventilation, equipment and supplies, personal computer, communication system shall be equipped in accordance with the specification requirements. [Spec. 330-2]
6. Calibration of the Superpave Gyratory Compactor is performed by the Contractor in accordance with his QC Plan and the records are documented in the lab file.  
[Spec. 330-2]
7. The laboratory is furnished with the necessary sampling and testing equipment and supplies for performing quality control, acceptance and verification sampling and testing. [Spec. 330-2]
8. The gradations of incoming aggregate including RAP, aggregate moisture content from stockpiles and / or combined cold feed aggregate shall be tested by the Contractor for process control at a min. frequency specified in his QC Plan. The testing of RAP material shall include A/C content and gradation of extracted aggregate. [Spec. 330-2]
9. The A/C content, mix gradation and volumetric properties of HMA shall be determined by the Contractor for daily process control at a frequency in accordance with his QC Plan. [Spec. 330-2].
10. All the QC sampling and testing are completed and the Control Charts are updated daily in accordance with the QC plan and the results are shown in a conspicuous place in the asphalt lab. The QC results shall be documented on the FDOT's Forms and entered into CQR daily. [Spec. 5-8 and 330-2]
11. The Contractor shall not use more than three mix designs per nominal max. aggregate size per traffic level per contract year. Exceeding this limitation shall result in a max. Composite Pay Factor of 1.00 for all designs used beyond this limit. [Spec. 334-3]

12. For projects with Traffic Levels D and E, do not permit the amount of RAP material used in the mix to exceed 30 % by the weight of total aggregate. For Traffic Levels A, B and C, do not permit the amount of RAP material to exceed 50 %. When using a PG 76-22 Asphalt binder, limit the amount of RAP to a max. of 15 %. [Spec. 334-2]
13. Verify that QC has obtained and submitted viscosity samples per 334-2.5.5. Insure that appropriate CQR has been entered. [Spec. 334-2]
14. The Initial Production LOT of all mix designs shall be established at 2000 tons unless waived by the Engineer. The acceptance of the Initial Production LOT shall be performed in accordance with the requirements specified in 334-4.3.5. [Spec. 334-4]
15. After the successful completion of the Initial Production LOT, Contractor's initiation of 4000 ton LOT size will be considered by the Engineer in accordance with the criteria specified in 334-4.3.4. [Spec. 334-4].
16. Run the split sample verification testing in accordance with the requirements specified in 334-4.5 and the same sample verification testing as specified in 334-5.3 in order to determine the validity of the Contractor's QC test results for the LOT acceptance. Document the results in the Asphalt Plant-Verification Report. [Spec. 334-4].
17. In the event that any of verification and/or resolution samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the min. possible pay factor for each quality characteristic as described in 334-8 will be applied to the entire LOT in question. If the LOT in question has more than two sublots, the pay factor of each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for each characteristic will be 0.8. In either event, the material in question will also be evaluated in accordance with 334-9.4. [Spec. 334-4].
18. In the event that an individual QC test result of a subplot for air voids, or the average subplot density for coarse graded mixes do not meet the requirements of the Table 334-5 (Master production range), the LOT shall be automatically terminated and the production of the mixture shall be stopped until the problem is adequately resolved. The material represented by the failing test result shall be evaluated in accordance with 334-9.4. [Spec. 334-7].
19. In the event that an individual QC test result of a subplot for gradation or A/C content does not meet the requirements of Table 334-5, steps shall be taken to correct the situation and actions taken shall be reported to the Engineer. If two consecutive QC tests for gradation or A/C content do not meet the requirements of Table 334-5, the LOT will be automatically terminated and production of the mixture stopped until the problem is adequately resolved and the material represented by the failing test result shall be evaluated in accordance with 334-9.4. [Spec. 334-7].

20. For small quantities, the Pay Factors shall be determined in accordance with the requirements of 334-8. In the event that the density of a LOT is less than 93 % of  $G_{mm}$  for coarse graded mixtures, the Department will assess the pavement's permeability. If the coefficient of permeability is less than or equal to  $125 \times 10^{-5}$  cm/s, the pavement shall be removed and replaced at no cost to the Department. [Spec. 334-8].
21. Double-check all the input data for the calculation of the Pay Factors and the correctness of the composite Pay Factor for each LOT. [Spec. 334-8].
22. Take necessary actions for the materials with low Pay Factor or low Composite Pay Factor in accordance with the requirements of 334-9 and the Contractor's evaluation of the in-place low Pay Factor material shall be performed in accord w/ [Spec. 334-9].
23. Plant scales are certified every six months and the required weekly weight comparison checks have been conducted. [Spec. 320-2]
24. The haul trucks have asphalt tight beds coated with acceptable asphalt release agent (not petroleum-based products such as diesel oil). Truck bed shall have a tarpaulin that can cover the entire load and holes in the side of the bed for checking load temperatures. [Spec. 320-5]
25. The stockpiles including rap material are free from contamination and are separated and identified as shown on the mix design. [Spec. 330-5]
26. Perform the verification measurements at a min. frequency of once per day to ensure that the temperature of the mix at the plant is checked and recorded in accordance with the procedures stated in the specifications. Document the results in the Asphalt Plant-Verification Report. Reject a load or portion of a load of HMA, when a mix temperature exceeds the acceptance limits. [Spec. 330-6 and CPAM Sec. 5.1]
27. The max. period that any mix may be kept in a hot storage or surge bin is 72 hours. For FC-5, the max. storage time is one hour. [Spec. 330-6]
28. Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the lying operations. [Spec. 330-3]
29. Perform verification test to ensure that Contractor's QC operations for asphalt rubber binder are conducted in accordance with the requirements of 336-5.4. [Spec. 336-5]
30. In the event that an individual QC test result of a subplot for gradation or A/C content does not meet the requirements of Table 337-2, step shall be taken to correct the situation and actions taken shall be reported to the Engineer. In the event that two consecutive individual QC test results for gradation or A/C do not meet the requirements of the Table 337-2, the LOT will be automatically terminated and production of the mixture shall be stopped. The material represented by the failing test result shall be evaluated in accordance with 334-9.4. [Spec. 337-6].

**FY 2003/2004 QC Category No. 7B**  
**STATEWIDE INSPECTION GUIDELIST**  
**Asphalt Milling / Paving**

**GENERAL PAVING**

1. A pre-paving conference is held before paving and milling operation and a written report is distributed. [CPAM Sec. 3.1]
2. A qualified CTQP Asphalt Paving Level II technician shall be on the roadway at all times when placing HMA at the job site. [Spec. 330-2]
3. The paving machine is equipped with automatic screed controls with a min. length of 25 feet that are being used during paving operation. [Spec. 320-5]
4. A constant supply of mix (head of material) is being maintained at the augers in front of the screed. [Spec. 330-9]
5. Do not place asphalt mixtures while rain is falling or when there is water on the surface to be paved. [Spec. 330-9]
6. Perform the verification measurements on HMA spread rate (yield) and pavement cross slopes with the min. frequencies of once per layer per day to ensure that the results are in compliance with contract requirements. Document the results in the Asphalt Roadway – Verification Report. [CPAM Sec. 5.1, 330-12]
7. Perform the verification measurements at a min. frequency of once per day to ensure that the temperature of the mix at the paving site is checked and recorded in accordance with the procedures stated in the specifications. Reject a load or portion of a load of HMA, when a mix temperature exceeds the acceptance limits. Document the results in the Asphalt Roadway - Verification Report. [Spec. 330-6, CPAM Sec. 5.1]
8. Trucks are not bumping the paver. After releasing the HMA material from the truck body to the paver, the remaining material in the truck shall not be cleaned and dump on the tacked surface in front of the paver. [Good practice]
9. A string line is being used for an accurate, uniform alignment of the pavement edge in areas where there is no curb and gutter. [Spec. 330-9]
10. Compaction equipment is equipped with wheel moistening systems, scrapers and pads to avoid having HMA adhering to the wheels. [Spec. 320-5]
11. Pneumatic-tire rollers are using tires inflated 50 to 55 PSI or as specified by the manufacturer. [Spec. 320-5]
12. Self-propelled pneumatic roller is used on first overbuild course and the traffic roller or vibratory roller is used on the first structural layer on milled surface and on asphalt rubber membrane interlayer (ARMI) layer. [Spec. 330-10]

**GENERAL PAVING... continued**

13. When using an extendable screed device to extend the screed's width on the full width lane or shoulder by 24 inches or greater, an auger extension, paddle, or kicker device shall be equipped and used during paving unless the Contractor provides written documentation from the manufacturer that these are not necessary. [Spec. 320-5]
14. For process control, the Contractor shall monitor the pavement temperature with an infrared temperature device. The roadway density shall be monitored by either 6-inch diameter roadway cores, a nuclear density gauge or other density measuring device at a min. frequency of once per 1500 feet of pavement. When the layer thickness is greater than or equal to one inch and an approved rolling pattern is used in lieu of density test, the density shall be monitored by 6-inch cores at a min. frequency of 3 cores per day for informational purposes. [Spec. 330-2]
15. Perform the verification activities at a min. frequency of once per day to ensure that the spread rate (yield) is in compliance with the Contract requirements. In case of verification with deficiencies, the Contractor shall take corrective action immediately and a recheck shall be made afterward. If the recheck indicates that the operations are still out of control, the operation shall be stopped and the quality of the defective areas shall be evaluated separately. The results shall be documented in the Asphalt Road-Verification Report. [CPAM Sec 5.1].
16. Protect the last structural layer placed prior to the friction course and newly finished dense-graded friction course from traffic until the surface temperature of these layers has cooled below 160°F. [Spec. 330-13]
17. The lift thickness meets the specification requirements. [Spec. 334-1]
18. When the intermediate layer will be opened to the traffic, the smoothness of the pavement shall be checked by 15 foot rolling straightedge to ensure that no smoothness deficiency is in excess of 3/8 inch. [Spec. 330-12]
19. Perform the verification activities by taking ten measurements of the cross slope per day for the first two days of the construction to ensure that Contractor measures the cross slope with a frequency of one check every 100 feet during paving operation and the deficiency is within the acceptable tolerance (+/- 0.2 % for travel lanes, +/- 0.05 % for shoulders). [Spec. 330-12]
20. Perform the verification measurements at a min. frequency of once per day after the first two days of paving operation to ensure that the cross slopes of the pavement are in compliance with the Contract requirements. [CPAM 5.1]
21. Document the roadway density random numbers in the worksheet and ensure that the 5 cores are cut from each subplot. Do not obtain cores any closer than 12 inches from an unsupported edge. After coring, core holes are patched properly within three days of coring. [Spec. 330-13, 334-5]



**GENERAL PAVING... continued**

22. Produce a finished surface of uniform texture and compaction with no pulled, torn, crushed or loosened portions and free of segregation, sand steaks, fat spots or ripples. Monitor the 15 foot rolling straightedge operations and corrective actions in accordance with CPAM Sec. 11.3. [Spec. 330-12, CPAM Sec. 11.3]
23. The transverse joint, longitudinal joint and pavement approaches to the bridge joints are constructed properly and checked by 15-foot manual straightedge to achieve smooth and compacted surfaces. The 15-foot manual straightedge shall also be used to check the smoothness on crossovers, intersections, tapers, transitions at beginning and end of project, parking lots and similar areas. [Spec. 330-12]
24. For night paving, sufficient lighting shall be provided at the job site. [Spec. 330-3]

**MILLING**

25. The milled surface is swept with a power broom or other approved equipment. A Street sweeper is used in urban and other sensitive areas. Any surface delamination or scaling pieces shall be removed. [Spec. 327-3, 327-4]
26. The milling surface has a uniform texture with no deviation in excess of ¼ inch. The depth of cut and the cross slope are checked periodically to ensure that the results are in compliance with the contract requirements. [Spec. 327-3, 327-4]
27. Repave all milled surfaces no later than the day after the surface was milled or as specified in contract. [Spec. 327-3]
28. Perform the verification measurements in accordance with 327-3 and CPAM Sec. 5.1 to ensure that Contractor checks the cross slopes at a frequency of one measurement every 250 feet during milling operations. [Spec. 327-3, CPAM Sec. 5.1]

**PRIME AND TACK COAT**

28. The asphalt distributor being used is in accordance with the specifications. [Spec. 300-3]
29. The roadway surface is cleaned prior to application of the tack coat. [Spec. 300-5]
30. Perform the verification measurements at a min. frequency of once per day to ensure that the tack coat is applied uniformly with proper spread rate checked by the Contractor at least twice per day and the tack has broken prior to the placement of asphalt. Document the results in the Asphalt Roadway-Verification Report. [Spec. 300-8, CPAM 5.1]

### **ASPHALT RUBBER MEMBRANE INTERLAYER (ARMI)**

31. Use ARB-20 for the binder and size No. 6 stone, slag or gravel for the cover material in ARMI . [Spec. 341-2]
32. Perform the verification measurements at a min. frequency of once per day to ensure that the application rate of the asphalt rubber binder and the cover material meets the specification requirements. Document the results in the Asphalt Roadway-Verification Report. [Spec. 341-6, CPAM Sec. 5.1]
33. The rolling operation of the ARMI layer conforms to the contract documents. [Spec. 341-6]
34. The ARMI layer is covered with the first course of asphalt concrete prior to being opened to traffic. [Spec. 341-6]

### **FRICITION COURSE**

35. During paving operations for friction course, the temperature of the mixture and the air temperature at lay down shall meet the specification requirements. [Spec. 337-7]
36. Perform the verification activities at a min. frequency of once per day to ensure that the spread rate of the friction course meets the specifications. Document the results in the Asphalt Roadway-Verification report. [Spec. 337-9]
37. The roller does not crush the aggregate of the friction course during compaction operations. [Spec. 337-8]
38. In the event that an individual QC test result of a subplot for gradation or A/C content does not meet the requirements of Table 337-2, step shall be taken to correct the situation and actions taken shall be reported to the Engineer. In the event that two consecutive individual QC test results for gradation or A/C do not meet the requirements of the Table 337-2, the LOT will be automatically terminated and production of the mixture shall be stopped. The material represented by the failing test result shall be evaluated in accordance with spec. [Spec. 337-6 & 443-9.4].